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CC181 Revised 1961 Growing Tomatoes in Nebraska for Chipping Purposes

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GROWING POTATOES IN NEBRASKA FOR CHIPPING PURPOSES

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From the potato chippers' standpoint potatoes utilized for chipping must be of relatively high specific gravity (1.070+), low in reducing sugars, and of low oil content and light-golden color when chipped. The factors which affect these qualities are varieties, the place where the potatoes are grown and cultural practices. Studies conducted in Nebraska in recent years indicate that chipping potatoes can be produced in both early and late crop areas in Nebraska. However, special attention must be given to proper cultural and storage practices to assure the production of potatoes of good chipping quality.

The purpose of this report is to inform Nebraska growers of the necessary cultural practices for the production of chipping potatoes and to make suggestions relative to these cultural practices based on available information.

A NINE-POINT PROGRAM FOR THE PRODUCTION OF CHIPPING POTATOES

1. Selection of varieties:

   a. In central Nebraska: Haig, Irish Cobbler, Kenneber, Blanca
   b. In western Nebraska: Haig, Kenneber, Blanca
   c. Irish Cobbler should be planted on sandy soils where scab is not a problem.
   d. Kenneber is a long season variety; plant on earliest date indicated for areas.

2. Planting date and rate with irrigation:

   a. Specific gravity increases as tuber size and maturity increase, which can be controlled by the proper combination of planting date and seed piece spacing.

   b. Planting guide for various areas:

Use 1.5 - 2.0 oz. seed pieces	Gibbon-Cozad	North Platte Hershey	Western Nebraska
Date of planting	March 25 - April 7	April 1 - 14	May 25 - June 10
Spacing between rows	36 - 38 inches	36 - 38 inches	36 inches
Spacing in rows	12 - 15 inches	12 - 15 inches	12 - 15 inches
Rate (bu/acre)	25 to 30	25 to 30	25 to 30
Possible harvest	July 20 - Aug 7	July 25 - Aug 7	Sept. 1 - Oct. 10

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c. The 15-inch-in-row spacing with Haig will produce the highest percentage of large tubers ($2\frac{1}{4}$ to 4 inch) and may be beneficial with the earliest planting and anticipated harvest dates.

d. Plant in moist, warm (45°F.+) soil for rapid plant emergence.

e. Plant certified seed. Diseased tubers generally produce chips of poor color.

3. Fertilizer application:

a. Nitrogen increases yield but decreases tuber maturity and specific gravity when too much is applied. Phosphorus regulates starch translocation from vines to tubers and can reduce specific gravity when limited. Low potassium or applications of muriate of potash (KCl) fertilizer reduce specific gravity.

b. Fertilize according to soil test (see your county Extension agent). Avoid excessive nitrogen fertility.

c. General recommendations:

Nitrogen - 0 to 40 lbs/acre with potatoes after a legume crop
40 to 80 lbs/acre with potatoes after corn

Phosphorus - apply according to soil test; avoid deficiency

Potassium - generally not needed in Nebraska soils; use sulphate form if potassium is required.

4. Irrigation practices:

a. Irrigate before plant emergence if soil becomes dry. Soil moisture is essential for plant emergence.

b. Irrigate early (soon after emergence) and frequently to keep top two feet of soil moist, but not wet, at all times until the plants reach their growth peak (lower leaves begin to turn yellow). Irrigations of three of four inches are sufficient.

c. Irrigate according to seasonal conditions late in the season. Tubers produced at low to medium soil moisture levels are of higher specific gravity than tubers produced at a high level of soil moisture. Avoiding heavy, late irrigations hastens vine and tuber maturity.

d. A guide to the frequency and rate of irrigation:

Temperature Since Last Irrigation	Water Used by Plants
70° - 80°F.	.15 - .20 in/day
80° - 90°F.	.20 - .30 in/day
90° - 100°F.	.30 - .40 in/day

5. Insect and Disease Control:

   a. Spray to control insects and diseases as recommended for general potato culture.

   b. Omission of DDT from late season spray applications may be beneficial in hastening maturity by allowing defoliation of plants by insects. However, DDT should not be withheld if insects are prevalent which cause plant toxicity or are vectors of disease.

6. Vine killing:

   a. Natural, slow maturation of vines results in the translocation of carbohydrates from vines to the tubers and consequent high specific gravity. Conversely, rapid vine killing by chemicals results in tubers of low specific gravity. Some chemical vine killers cause internal tuber discoloration.

   b. Vine-beating should not be practiced more than three days prior to harvest. Studies in other states indicate that vine beating is followed by a rapid decrease in tuber chipping quality.

7. Harvesting:

   a. Exposure of tubers to low temperatures (below 40°F.) and high temperatures (above 80°F.) prior to or during harvest impairs their chipping quality.

   b. In central Nebraska, harvest potatoes only during the early morning and late afternoon when temperatures do not exceed 80°F.

   c. In western Nebraska, harvest potatoes before the danger of exposure of tubers to temperatures below 40°F. occurs. If late September or early October harvesting is necessary, ridging the potato rows with dirt late in the season may avoid field chilling of the tubers.

   d. Avoid harvest injury to tubers by the use of all recommended precautions.

8. Storage of chipping potatoes:

   a. Reducing sugars build up in tubers at storage temperatures that are below 50°F.

   b. Chemicals are available which will retard sprout growth and permit the storage of potatoes at 50°F. These chemicals are (1) maleic hydrazide (MH 30) applied to the vines at the rate of one gallon per acre, four to six weeks prior to harvest, and (2) chloro-IPC applied as a vapor to potatoes in storage (one gram/cwt. of potatoes). Further information regarding the use of these chemicals can be obtained from:

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      Scotts Bluff Experiment Station
      Mitchell, Nebraska

The Department of Horticulture and Forestry
College of Agriculture
University of Nebraska
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c. Tubers of some potato varieties will reconstitute after cold storage at 40°F. and are usable for chipping. Reconstitution should occur with storage at 70°F. for 10 days to 2 weeks. However, Haig, and Dazoc are unreliable with regard to reconstitution following cold storage, i.e., some lots will reconstitute; others will not.

d. Control of storage temperature and ventilation is of major importance; store potatoes in bins 10 ft. x 10 to 14 ft; taper lower part of bin side walls to the center of the bin floor.

1) Ventilate bins by forced air distributed to and through the bins by means of air ducts 24" x 16" in the bin floor.

2) Use thermostatically controlled heaters

3) Consult the Extension Entomologist or the Department of Horticulture and Forestry for further information.

9. Marketing chipping potatoes:

a. Test potato samples for specific gravity prior to and during harvest or storage. The specific gravity of chipping potatoes must be in excess of 1.070. The higher the value, the better the quality.

b. Use a "potato hydrometer" to measure specific gravity. This instrument can be obtained from the Potato Chip Institute International, 946 Hanna Building, Cleveland 15, Ohio.

c. Test potato samples for reducing sugars by use of "chip color tester" tape, which can be obtained from the Potato Chip Institute International. Low reducing sugar content is associated with light chip color and is an essential quality of chipping potatoes.

d. Potatoes which will not produce good chips at harvest time will not improve with storage. Find another market for them.

e. Do not over-ice shipments of potatoes during warm months. Chilling of tubers in transit may destroy their chipping quality; this applies to winter shipments also.

Note:

For detailed information regarding chipping potatoes, refer to:

1. "Potato Handbook 1960"
   Potato Association of America, New Brunswick, New Jersey.
2. "The Production of Good Chipping Potatoes", C. W. Frutchey, H. W. Chapman and A. M. Burkley, Colorado State University, Extension Service, Fort Collins, Colorado.